# STATE BUILDING CODE COUNCIL

Log No. <u>14-E18</u>

1. S	tate Building C	ode to be Amended:		
	Internation	onal Building Code		
	☐ ICC ANS	SI A117.1 Accessibility Code	☐ International Mechanical Code	
	Internation	onal Existing Building Code	☐ International Fuel Gas Code	
	Internation	onal Residential Code	☐ NFPA 54 National Fuel Gas Code	
	Internation	onal Fire Code	☐ NFPA 58 Liquefied Petroleum Gas Cod	e
	☐ Uniform	Plumbing Code	☐ Wildland Urban Interface Code	
	Section(s): 2012 WSEC	Commercial Definitions		
	<b>Title:</b> Single-Zone			
2. P	roponent Name	e (Specific local government, or	rganization or individual):	
	<b>Proponent:</b>	• , , ,	ng Company	
	Title:	Principal		
	Date:	2/28/2014		
3. D	esignated Cont	act Person:		
	Name:	Eric Vander Mey		
	Title:	Principal		
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		,	300, Seattle, WA 98109	

**4. Proposed Code Amendment**. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert <u>new</u> sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC <u>website</u>)

Code(s) 2012 WSEC Section(s) Commercial Chapter 2 Definitions

Enforceable code language must be used; see an example <u>by clicking here</u>. Amend section to read as follows:

ZONE. A space or group of spaces within a building with heating or cooling requirements that are sufficiently similar so that desired conditions can be maintained throughout using a single controlling device.

ZONE, Single-. Single-zone systems serve a single HVAC zone and can be shut down when not required without affecting the operation of adjacent areas. Examples include, but are not limited to, packaged unitary equipment, splits systems, 2-pipe or 4-pipe fan coils, VRF fan coils, or hydronic heatpumps that serve a single-zone with a single thermostat.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

There is no definition of single-zone and how this is applied for section C407.

### TABLE C407.5.1(2) HVAC SYSTEMS MAP

CONDENSER	HEATING SYSTEM CLASSIFICATION	STANDARD REFERENCE DESIGN HVC SYSTEM TYPE <sup>C</sup>			
COOLING SOURCE		Single-zone Residential System	Single-zone Nonresidential System	All Other	
	Electric resistance	System 5	System 5	System 1	
Water/ground	Heat pump	System 6	System 6	System 6	
	Fossil fuel	System 7	System 7	System 2	
	Electric resistance	System 8	System 9	System 3	
Air/none	Heat pump	System 8	System 9	System 3	
	Fossil fuel	System 10	System 11	System 4	

- a. Select "water/ground" if the proposed design system condenser is water or evaporatively cooled; select "air/none" if the condenser is air cooled. Closed-circuit dry coolers shall be considered air cooled. Systems utilizing district cooling shall be treated as if the condenser water type were "water." If no mechanical cooling is specified or the mechanical cooling system in the proposed design does not require heat rejection, the system shall be treated as if the condenser water type were "Air." For proposed designs with ground-source or groundwater-source heat pumps, the standard reference design HVAC system shall be water-source heat pump (System 6).
- b. Select the path that corresponds to the proposed design heat source: electric resistance, heat pump (including air source and water source), or fuel fired. Systems utilizing district heating (steam or hot water) and systems with no heating capability shall be treated as if the heating system type were "fossil fuel." For systems with mixed fuel heating sources, the system or systems that use the secondary heating source type (the one with the smallest total installed output capacity for the spaces served by the system) shall be modeled identically in the standard reference design and the primary heating source type shall be used to determine standard reference design HVAC system type.
- c. Select the standard reference design HVAC system category: The system under "single-zone residential system" shall be selected if the HVAC system in the proposed design is a single-zone system and serves a residential space. The system under "single-zone nonresidential system" shall be selected if the HVAC system in the proposed design is a single-zone system and serves other than residential spaces. The system under "all other" shall be selected for all other cases.

Recommend adding definition based on IECC code commentary. See below:

ZONE. A space or group of spaces within a building with heating or cooling requirements that are sufficiently similar so that desired conditions can be maintained throughout using a single controlling device.

The simplest all-air system is a supply unit serving a single-temperature control zone. Ideally, this system responds completely to the space needs, and welldesigned control systems maintain temperature and humidity closely and efficiently. Single-zone systems can be shut down when not required without affecting the operation of adjacent areas. Thus, in a thorough discussion of the term "zone," the concept of "zoning" for temperature control requires discussion.

#### SECTION C403 BUILDING MECHANICAL SYSTEMS

C403.1 General. Mechanical systems and equipment serving the building heating, cooling or ventilating needs shall comply with Section C403.2 (referred to as the mandatory provisions) and either:

- 1. Section C403.3 (Simple systems); or
- 2. Section C403.4 (Complex systems).
- Section C403 is divided into four parts. Sections C403.1 and C403.2 deal with general issues that are applicable to all systems. Sections C403.3 and C403.4 will be applicable depending on the type of system. Section C403.3 applies to buildings served by unitary or packaged HVAC equipment as listed in Tables C403.2.3(1) through C403.2.3(5), economiz-

ers as listed in Table C403.3.1(1) and hydronic system controls. Section C403.4 applies to buildings served by HVAC equipment, including economizers, that has the minimum efficiency requirements of Table C403.2.3(1) or C403.2.3(2), variable air volume (VAV) fan controls, hydronic system controls, hydronic heat pump systems, heat rejection equipment and fan speed controls. Unitary equipment is self-contained, packaged equipment from a single manufacturer, while hydronic systems consist of separate components, such as chillers, cooling towers and air handlers. Single-zone systems are those that serve just one zone and are controlled by a single thermostat. Multiple-zone systems are capable of simultaneously satisfying the comfort needs of a number of zones. Commentary Table C403.1 details

#### ASHRAE 90.1 Definitions for reference:

single-zone system: an HVAC system serving a single HVAC zone.

zone, HVAC: a space or group of spaces within a building with heating and cooling requirements that are sufficiently similar so that desired conditions (e.g., temperature) can be maintained throughout using a single sensor (e.g., thermostat or temperature sensor).

system: a combination of equipment and auxiliary devices (e.g., controls, accessories, interconnecting means, and terminal elements) by which energy is transformed so it performs a specific function such as HVAC, service water heating, or lighting.

## ASHRAE 90.1-2007 Users Manual Excerpts:

3. Determine the Budget Building Design System Type Category: This is based on the proposed design system type. If the occupancy is residential (including hotel/motel guest rooms) and it is a single-zone system, then select "Single-Zone Residential System." If the occupancy is not residential, but it is a single-zone system, then select "Single-Zone Nonresidential System." For any other type of system, select "All Other." A single-zone system uses one space temperature control device, such as a thermostat, for the entire system. If there is more than one space temperature control device on the system, then the "All Other" category applies.

## 90.1-2007 User Manual Case Study Example

Retail spaces are served by a four-pipe fan coil system so that they can be independently shut down if the stores' operating hours differ significantly. A variable air volume (VAV) air-handling system served by a centrifugal chiller and a boiler provides space conditioning in the office levels. The apartments are heated and cooled by four-pipe fan coil systems, which are also served by the chiller and boiler. The underground parking is ventilated during retail business hours.

A 160-ton, high-efficiency chiller with a rating of 0.6 kW/ton and a 2,250,000 Btu/h boiler serve all of the heating and cooling loads in the building.

In the proposed building, all of the

cooling systems are served by a watercooled chiller; therefore, the condenser cooling source is Water/Ground and the system types considered are in the top half of the figure. All of the systems in the proposed building use hot water from the natural gas boiler; therefore, the heating system classification is fossil fuel and the potential choices for systems are system 7 (a four-pipe fan coil system) or system 2 (a variable air volume system with reheat). The zoning classification choices of "single-zone residential," "single zone nonresidential," and "all other" define the system. The retail stores are single-zone systems so as single-zone nonresidential systems they are defined as system 7 (fourpipe fan coil). The office spaces are on a multiple-zone air handler; therefore, they are in the "all other" system category and the fan system for the offices would be system 2 (VAV system with reheat). The apartment HVAC is defined as residential single-zone systems and is mapped to system 7 (four-pipe fan coil).

6.	<b>Specify what criteria this proposal meets.</b> You may select more than one.
	☐ The amendment is needed to address a critical life/safety need.
	☐ The amendment is needed to address a specific state policy or statute.
	☐ The amendment is needed for consistency with state or federal regulations.
	☐ The amendment is needed to address a unique character of the state.
	The amendment corrects errors and omissions.

7.	Is there an economic impact:	Yes	No No
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Explain:

Amendment is needed to clarify the definition of single-zone to avoid confusion and improve enforceability of the code.

If there is an economic impact, use the Table below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

	Construction <sup>1</sup>		Enforcement <sup>2</sup>		Operations & Maintenance <sup>3</sup>	
Building Type	Costs	Benefits <sup>4</sup>	Costs	Benefits <sup>4</sup>	Costs	Benefits <sup>4</sup>
Residential	N/A	N/A	N/A	N/A	N/A	N/A
Single family	N/A	N/A	N/A	N/A	N/A	N/A
Multi-family	N/A	N/A	N/A	N/A	N/A	N/A
Commercial/Retail	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	N/A	N/A	N/A	N/A	N/A	N/A
Institutional	N/A	N/A	N/A	N/A	N/A	N/A

Please send your completed proposal to: <a href="mailto:sbcc@ga.wa.gov">sbcc@ga.wa.gov</a>

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.

 $<sup>^{1}</sup>$  \$\square foot of floor area or other cost. Attach data. **Construction** costs are costs prior to occupancy, and include both design and direct construction costs that impact the total cost of the construction to the owner/consumer.

<sup>&</sup>lt;sup>2</sup> Cost per project plan. Attach data. **Enforcement** costs include governmental review of plans, field inspection, and other action required for enforcement.

<sup>&</sup>lt;sup>3</sup> Cost to building owner/tenants over the life of the project.

<sup>&</sup>lt;sup>4</sup> Measurable benefit.